1887

Cotton

William Carter Stubbs

COTTON.

BULLETIN No. 8

OF THE

STATE EXPERIMENT STATION

BATON ROUGE, LA.

Wm. C. Stubbs, Ph. D.,

—DIRECTOR—

—ISSUED BY—

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LOUISIANA SUGAR EXPERIMENT STATION,
BATON ROUGE, LA.

Major T. J. Bird, Commissioner of Agriculture, Baton Rouge, La.:

Dear Sir—I hand you herewith for publication Bulletin No. 8, covering experiments in cotton, made during the past season on the State Experiment Station at Baton Rouge, La. I regret that pressure of official duties has prevented an earlier preparation.

Respectfully,

WM. C. STUBBS, Director.

COTTON

ITS HISTORY.

The history of cotton is coeval with human history. The earliest records of the Asiatics and Egyptians speak of it. We are informed by the great Roman author Pliny, that garments of cotton were worn by the ancient Egyptians more than one thousand years before Christ. Surplices were made of it for their priests. Herodotus speaks of this plant as growing in India 450 B. C. and bearing a fleece more delicate and beautiful than that of sheep. The time of the origin and culture of cotton in Asia is hidden in great obscurity. It certainly antedated the Macedonian conquest. From that time to the present, it has steadily grown in favor and extent of cultivation.

Cotton cloth was used as awnings in a theatre by Lucullus and by Cæsar to cover the forum and to pave the street leading from his house to the Capitoline Hill. The generals of Alexander brought the plant and fabrics made from it to Greece. Cotton has been grown from time immemorial in Central Africa and it is the opinion of many historians that it was carried thither from Asia. It is certain that a knowledge of this plant and its products was obtained by the Europeans from India and Egypt.

Cotton was found growing wild in certain parts of America by Columbus in 1492 and subsequent explorers found it in abundance along the banks of the Mississsippi and its tributaries. It is certain that the Aztecs and the Incas had obtained a good knowledge of the cultivation and manufacture of cotton long before the occupation of America by the Europeans.

It is therefore pretty generally believed that cotton is indigenous to Asia, Africa and America. It is more certain that it is not native of Europe and was not generally known their until a comparatively recent date. The history of cotton in the United States dates from 1784, when a shipment of eight bales was made to Europe, since that time its cultivation has steadily increased until now our annual crop reaches over six millions of bales.

BOTANICAL RELATIONS.

Cotton belongs to a large class of plants, known to the Botonists as Malvacaæ. Of this class, beside cotton, we have in cultivation the okra and the hollyhock. There are said to be many species of cotton—two of which only are cultivated in the South—the one upland or common cotton; Gossipium Herba-

ceum, the other "Sea Island cotton," "Gossipium Barbadense." The latter is cultivated only on the coast or neighboring islands, while the former constitutes the chief staple of the Southern States. The bloom of upland cotton is white or cream colored the first day, turning red on the next and falling on the third, leaving a small boll enveloped in the calyx. This boll continues to develop until it reaches the size and shape of an egg, when on maturity it splits into three to five cells, containing the seed, wrapped in a tomentose wool. This wool constitutes the lint or fibre which clothes the world.

HABITUDES.

Cotton is emphatically a child of the sun and flourishes only in warm latitudes. Its heliotropic tendencies are even more marked than the poetical sunflower. Its leaves receive the first glow of morning light and following the King of Day, dismiss it at eve in the west with dewy regrets. With us it is an annual herb. Further south it appears to be a shrub, while under the tropics, it is a small tree enduring many years. It is an exogenous plant, with two seed leaves and a long top root. Among our field crops it stands without a fellow—alone—and peculiar in its habits and characteristics. Its nearest relation among our cultivated plants, as before mentioned, is the okra, with which it crosses, to form some of the many evanescent varieties of *okra-cotton*, now on the market. By its long deep tap root, it is enabled to withstand droughts and to pump up from the lower layers of the soil, plant food, unavailable to fibrous rooted plants, which is quickly assimilated by its large leaf surface. Hence it thrives better on poor land than any other field crop.

Formerly cotton was not grown north of the isothermal line 36°, but under the influence of phosphatic manures, its cultivation in late years has been extended several degrees beyond this line. The region best adapted to successful culture is included between the 30th and 35th degrees of North Latitude. North of this belt the seasons are too precarious, while south of it, excessive rains and depredations of the caterpillar greatly interfere with large production.

PLANTING AND CULTIVATION.

The soil best adapted to cotton is yet not fully decided. Clay loams, well drained and sandy loams, resting upon clay subsoils are both highly recommended. Both should contain a fair amount of vegetable matter.

The width of the rows and the distance apart of the stalks in the row, must depend upon the fertility of the soil and the rain supply. In poor lands or on soils subject to drouth during fruiting season, thin planting must be practiced to obtain the largest results. Mr. David Dickson, the great cotton planter of

Georgia, now no more, always contended that cotton needed distance only one way. If therefore the rows were wide, it could be crowded in the drill and *vice versa*.

Deep and thorough preparation of soil, followed by pulverization should always precede planting The planting should be done by some of the excellent and cheap cotton planters now to be everywhere found. since only the machine will give that uniform and straight stand, which so facilitates the subsequent chopping. It furthermore economizes the seed, a point of great importance, when the true value of this article as a manure and feed stuff is appreciated. The first plowing of cotton may be as deep and thorough as possible, but all subsequent workings ought to be as shallow as the character of the land will permit, since root-breaking to this plant is almost a disaster. The implements in general use for the cultivation of cotton are the scooter and scrape, the solid and buzzard-wing sweeps, the side harrows and the numerous cultivators. After every heavy rain the soil should be stirred and during drought a shallow implement run just deep enough to break the continuity of the pores of the soil and to form an upper layer, which shall act as a mulch to conserve the moisture in the soil, has often been found highly beneficial. Grass is an enemy of the cotton planter and should never be permitted (if possible to prevent) to obtain possession of his fields. In cotton as in all other crops the hoe should be used as little as possible. It is element of cost excessive to bear and with this plant often causes the disease known as "*sore shin*" by breaking or removing the epidermis of the tender stalk in the effort of the hoeman to remove the last spire of grass.

When to plant, must be decided by the climate and by the character of the soil. When the ground is warm enough to promptly germinate the seed and give a vigorous healthy plant, then the seed can be wisely trusted in the earth. This is usually the case in this latitude in April. Planting in May is often hazardous, on account of the delay in germination, due to the prevalence of drouths at this period. When May planting is practiced, the seed should be covered rather deeply and firmed with a light roller.

A practice prevails among some of our progressive planters to plant late and highly fertilize. By this means, they claim a crop of grass which so frequently infests an early planting, is destroyed, the costly hoe labor avoided and the plant pushed quickly into vigor by the underlying fertilizer, soon occupies the ground and renders the after culture both simple and and inexpensive. As a rule, it is best to plant poor unfertilized lands early and rich or highly fertilized lands late.

COMPOSITION OF THE COTTON PLANT.

A five hundred pound bale of lint cotton, will require fifteen hundred pounds of air dried "seed cotton." Of the latter, one

third or five hundred pounds is lint, another third or five hundred pounds is hulls and the remaining five hundred pounds is kernels. To produce this fifteen hundred pounds of seed cotton, there will be required five hundred pounds of leaves, fifteen hundred pounds of stalks, five hundred pounds of roots and five hundred of bolls or burrs. In other words to produce a five hundred pound bale of lint cotton, an acre must produce forty-five hundred pounds of vegetable matter, or two and a quarter tons.

To produce this amount the following mineral ingredients will be required.

	Lint	Seed	Stalks	Leaves	Burrs	Roots	Total
Phosphoric Acid	.65	14.10	5.43	5.35	4.54	1.91	31.98
Potash	2.10	13.40	11.36	9.65	9.31	5.84	51.66
Lime	1.48	3.85	13.27	18.64	17.65	5.71	60.60
Magnesia	.58	4.95	4.48	3.14	3.98	2.01	19.14
Sulphuric Acid.	.31	1.38	2.50	7.28	8.60	1.10	21.17
Oxide of Iron..	.15	.66	.94	2.97	3.32	1.74	9.78
Chlorine	.45	.61	3.18	3.44	2.67	1.99	12.34
Soda	.53	1.44	4.56	5.50	5.74	2.88	20.65
Silica	.09	0.39	2.14	4.48	9.25	1.98	18.23

In other words a soil must furnish the above ingredients besides a goodly amount of Nitrogen to make a five hundred pound bale of cotton.

But fortunately most soils hold large contents of all these ingredients and supply them abundantly to all plants, except Phosphoric Acid, Potash and Nitrogen. To supply these needed ingredients is the prime object of manuring. But when the cotton planter makes the proper disposition of the products of cotton, let us see how far he needs the aid of manure to maintain the original fertility of his soils. The leaves and capsules should be permitted to fall to the ground and not removed as is usual, by the depredations of half starved cattle. The stalks should be knocked down and plowed under instead of being destroyed by fire. The seed should be returned to the soil, or else when sold to the oil mill their equivalent in a first class commercial fertilizer should be purchased. When all this is done only the trifling loss of about ½ pound of phosphoric acid and 2 pounds of Potash is sustained to each acre. Theoretically then cotton is the least exhausting crop grown, but how is it in practice? Unfortunately the decennial census returns cry out in thunder tones against us and tell the world in convincing figures that our acre yields are fast decreasing under constant cropping in cotton. Our soils are being rapidly depleted and exhaustion will sooner or later come, unless we stop the numerous leaks now found on many cotton plantations. Wisdom and economy would suggest the careful return to the

soil of every product of cotton save the lint. But there are two incidents in cotton growing, which tend in themselves to to soil depletion, which are usually over looked by the agricultural chemist, and rarely appreciated by the planter. 1st. Cotton is planted in early spring and harvested in late fall, its period of growth extending through the entire summer and much of the fall. During this period of growth, with clean culture under hot suns nitrification is most intense and with it a rapid oxidation of the vegetable matter of the soil. This partially explains why cotton is the most profitable crop on poor land, but it also tells in plainer language, that the vegetable mould "*humus*," so essential to fertility, is fast disappearing and with it soil nitrogen. Even our rich alluvial lands once thought inexhaustible, from this cause, coupled with the baneful practice of selling cotton seed, are now responding in gratifying returns to the well directed use of Nitrogenous manures. A crop of pea vines turned under every second or third year, would aid materially in restoring this lost humus.

2d. Cotton is removed in late fall and our lands are left naked unoccupied and exposed to the drenching rains of our semitropical winters and much of the finer material (which furnishes the plant food in all soils) is washed away, and a goodly quantity of plant food is carried so far down into the soil as to be forever beyond the reach of plants, even the tap root of cotton. The first loss is very severe in rolling or hilly lands, as is shown by the numerous furrowed red hillsides which everywhere meet the eye of the traveller through the South Atlantic States. The second loss is greatest in sandy lands andleast in clay. It has been clearly demonstrated, that a loss of soil fertility will always occur whenever lands are left in bare fallow. A plant suitable for occupying the ground between the gathering of one crop and the planting of another, would be an inestimable boon to the cotton planter. Oats sown in the cotton in August or September and lightly harrowed in or planted in October and November, after the cotton has been harvested affords only a partial remedy.

MANURES FOR COTTON.

The following taken from Bulletin No. 2, issued over a year ago, explains the manures used elsewhere successfully.

Thanks to the Experiment Stations, and a large class of progressive farmers in the South, the manurial requirements of cotton are well understood. The following formula has been used with excellent results all through the South, viz:

700 lbs. Cotton Seed Meal.
1,100 lbs. Acid Phosphate:
200 lbs. Kainite.

This mixture is fully the equal of the best guanos found in our markets, and will cost considerably less. If objection be found to mixing it on the plantation, some of the factories in New Orleans will manipulate it at a small price over cost of materials. The above is recommended with the

belief drawn from a large number of experiments, carefully conducted by the writer, that cotton seed meal is fully the equal of cotton seed as a source of Nitrogen. Cotton seed ought never to be used as a fertilizer until its oil, *which has no fertilizing value whatever*, is extracted. Every ton of cotton seed yields 35 to 40 gallons of oil, which usually sells at about 30 cents per gallon. Therefore, if all the cotton seed, over and above what is required for planting, could be passed through a mill for the extraction of its oil, and the latter turned into money, what a vast wealth would be added annually to the cotton industry which is now buried with the seed. *Unfortunately the present prices of all cotton seed products are low, and, therefore, but little inducement can be offered the farmer by the mills to exchange his seed for meal.* The seed now used by the mills are purchased outright, and the proceeds rarely return to the farm upon which the seed was grown. *This is radically wrong* Cotton, when everything except the lint is returned to the soil, is one of the least exhausting crops, but when the seed are sold to the mills and cattle consume the bolls and staks left in the field (as is frequently the case), it rises high in the scale of exhausting crops, and sooner or later the soils upon which it is continually grown will reach that point of depletion as to cease to yield remunerative returns without the addition of fertilizers. Whenever the seed go to the mills, the meal and hulls, especially the former, should be returned to the farm with proper care. The Sothern cotton planter should buy no Nitrogen. The manure from his domestic animals reinforced by his cotton seed or cotton seed meal (should he sell his seed), ought to grow all his crops. Under no circumstances should stable manure or cotton seed be used alone under cotton. For small grain and corn their use is applicable, but not advisible. They should both be composted with acid phosphate. "The compost is the best manure in the world for cotton," is a common declaration among intelligent planters of Georgia and Alabama. There is a power in the combination, a strength in the mixture, a ferment in the union which multiplies roots, enlarges foliage and increases the fruit. The compost, prepared difficulty for each crop, not only economizes, but properly and effectually utilizes the waste products of the farm, and in its preparation and use there is developed in the farmer powers of observation and reflection hitherto latent. Complete manures or Guanos should not be purchased until all home resources for manure have been exhausted, and only then when its guaranteed constituents are known to be adapted to the soils and crops. Acid Phosphates of a high grade are the best to use in a compost. Below is appended the formula best suited for cotton:

100 bushels Cotton Seed.
100 bushels Stable Manure.
1 ton Acid Phosphate, high grade.

If the above is to be used on very sandy lands, one-half ton of Kainite may be advantageously added. Dissolve in water and use the latter to wet the compost.

Since the success of a compost depends materially upon the proper manner of preparing it, full directions are here inserted:

DIRECTIONS FOR MAKING COMPOST.

Take an equal part of the Stable Manure, say ten bushels, and spread it out in a level place, under shelter, to the nepth of three inches. Sprinkle over it 100 pounds of Acid Phosphate. Next spread over this ten bushels of Cotton Seed, made thoroughly wet. Then another sprinkle of 100 pounds of Acid Phosphate. Continue this rotation till the quantities are exhausted and then cover with a rich earth, from the fence corners, five inchs deep. Permit it to remain until ready for use, four to six weeks will do, and cut vertically down with a mattock. Mix well and apply from 300 to 1000 pounds per acre in the drill at the time of planting.

Be careful to wet the Cotton thoroughly and buy only a first-class Acid Phosphate.

How far results obtained elsewhere were applicable here remained to be determined by experiments, accordingly a series of systematic experiments in cotton was instituted at the State Experiment Station, for the purpose of determining the following questions:

1st—What ingredients of commercial manures do our soils need for the successful production of cotton. Having determined this we have

2nd—What form of these ingredients was most beneficial to cotton.

3d—What quantity produced the best results.

The first question is asked directly in plat 5 and incidentally in them all. The second and third questions are answered as to nitrogen in plat 5, as to phosphoric acid in plat 6, and as to potash in plat 7.

Of the nitrogenous manures we have used nitrate of soda (15 per cent nitrogen); sulphate of ammonia (21 per cent of nitrogen); dried blood (10 per cent nitrogen), and cotton seed meal (7 per cent nitrogen). The first and second are mineral, the third animal, and the fourth vegetable forms. Such quantities of each are taken as to represent equal quantities of nitrogen and each are used alone and in combination in quantities representing one-third, two-third, and a whole ration.

Beside these fish scrap, tankage and a mixture of nitrate soda, sulphate of ammonia and cotton seed meal, called mixed nitrogen, are also used.

The phosphatic manures are represented by dissolved bone black, acid phosphate, orchilla phosphate, bone dust, and Charleston floats. The potassic manures are supplied in kainand the sulphate and muriate of potash. Both of these are used in like combinations and quantities as the nitrogenous manures.

The following are the experiments with results:

NITROGENOUS MANURES.

Size of Experiment One-Twentieth of Acre.

PLAT NO. 5—COTTON.

No. 1—Nothing.
No. 2—7 lbs Nitrate Soda.
No. 3—5 2-11 lbs Sulphate of Ammonia.
No. 4—10 lbs Dried blood.
No. 5—15½ lbs Cotton Seed Meal.
No. 6—14 lbs Acid Phosphate.
No. 7 —4½ lbs Muriate Potash.
No. 8 { 15½ lbs Cotton Seed Meal. / 14 lbs Acid Phosphate.
No. 9 { 15½ lbs Cotton Seed Meal. / 14 lbs Acid Phosphate.
No. 10—Nothing.
No. 11 { 14 lbs Acid Phosphate / 4½ lbs Muriate Potash. } =Mixed Minerals.
No. 12 { 3½ lbs Nitrate Soda / Mixed Minerals. } =⅓ Ration.

No. 13 { 7 lbs Nitrate Soda=⅜ ration. / Mixed Minerals.
No. 14 { 10½ lbs Nitrate Soda=1 ration. / Mixed Minerals.
No. 15—Mixed Minerals.
No. 16 { 2 13-22 lbs Sulphate Ammonia=⅛ ration. / Mixed Minerals.
No. 17 { 5 2-11 lbs Sulphate Ammonia=¼ ration. / Mixed Minerals.
No. 18 { 7 17-22 lbs Sulphate Ammonia=1 ration. / Mixed Minerals.
No. 19—Mixed Minerals.
No. 20—Nothing.
No. 21 { 5 lbs Dried Blood=⅛ ration. / Mixed Minerals..
No. 22 { 10 lbs Dried Blood=¼ ration. / Mixed Minerals.
No. 23 { 15 lbs Dried Blood=1 ration. / Mixed Minerals.
No. 24—Mixed Minerals.
No. 25 { 7¾ lbs Cotton Seed Meal=⅛ ration. / Mixed Minerals.
No. 26 { 15½ lbs Cotton Seed Meal=¼ ration. / Mixed Minerals.
No. 27 { 23¼ lbs Cotton Seed Meal=1 rati n. / Mixed Minerals.
No. 28—Mixed Minerals.
No. 29 { 4½ lbs Fish Scraps=⅛ ration. / Mixed Minerals.
No. 30 { 9 lbs Fish Scraps=¼ ration. / Mixed Minerals.
No. 31 { 13½ lbs Fish Scraps=1 ration. / Mixed Minerals.
No. 32—Nothing.
No. 33—Mixed Minerals.
No. 34 { 2½ lbs Nitrate Soda; 1¾ lbs Sulphate Ammonia; 2 1-10 lbs Cot. Seed Meal; Mixed Minerals. } =Mixed Nitrogen ½ ration.
No. 35 { Mixed Nitrogen=⅜ ration. / Mixed Minerals.
No. 36 { Mixed Nitrogen=1 ration. / Mixed Minerals.
No. 37—Mixed Minerals.
No. 38 { 7½ lbs Tankage=⅛ ration. / 4½ lbs Muriate Potash.
No. 39 { 15 lbs Tankage=¼ ration. / 4½ lbs Muriate Potash.
No. 40 { 22½ lbs Tankage / 4½ lbs Muriate Potash.
No. 41—15 lbs. Tankage.
No. 42—Nothing.

TREATMENT OF PLAT NO. 5.

Manures put out April 15th, bedded April 15th, planted April 17th off-barred May 11th and 12th, chopped May 17th, dirted 26 and 27th, wit scooter and scraper, hoed June 24th to 29th, plowed out and laid by Jun 30 and 31st, with scooter and scraper.

YIELD OF PLAT NO. 5.

No. of Experiment.	First Picking.	Second Picking.	Third Picking.	Fourth Picking.	Fifth Picking.	Total.	Total Per Acre.	Kind of Manure.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
1	4	6	8	9	⅛	27⅛	550¾	Nothing.
2	5	8	9	12	¼	34¼	685	Nitrate Soda.
3	7	8	10	9	⅛	34⅛	690	Sulphate Ammonia
4	6	6	10	9	¼	31¼	625½	Dried Blood.
5	9	12	13	10	⅛	44⅛	390½	Cotton Meal.
6	8	9	10	8	½	35½	710½	Acid Phosphate.
7	5	6	9	10	½	30½	610½	Muriate Potash.
8	12	18	20	10	¼	60¼	1205½	Cotton Meal. Acid Phosphate.
9	6	12	15	12	1	46	920¼	Cotton Meal. Muriate Potash.
10	4	7	8	9	1¼	29¼	565	Nothing.
11	8	9	8	14	⅜	39⅜	780	Mixed Minerals.
12	8	13	12	11	⅓	44⅓	890	Nitrate Soda.
13	9	14	13	14	1	51	1020	Group.
14	9	15	14	13	1¼	52¼	1045	
15	5	18	17	11	1	52	1040	Mixed Minerals.
16	5	20	18	10	1⅓	54⅓	1090	Sulphate
17	6	20	30	6	1	63	1260	Ammonia
18	8	26	19	10	1⅓	64⅓	1290	Group.
19	8	20	22	10	2	63	1260	Mixed Minerals.
20	6	21	21	4	1⅓	53⅓	1070	Nothing.
21	11	16	18	6	1	52	1040	Dried
22	12	18	20	9	1¼	60¼	1205	Blood.
23	12	18	21	9	1	61	1220	Group
24	8	18	20	6	1	53	1060	Mixed Minerals.
25	14	25	30	4	1	74	1480	Cotton Meal.
26	15	21	33	4	1¼	81¼	1625	Group.
27	15	30	35	2	1	83	1660	
28	8	16	20	8	1	53	1060	Mixed Minerals.
29	9	21	18	10	⅕	58⅕	1170	Fish Scrap.
30	13	24	20	4	1	62	1240	Group.
31	14	25	21	6	1	67	1340	
32	6	12	13	4	1	36	720	Nothing.
33	7	17	21	2	1¼	48¼	965	Mixed Minerals.
34	8	22	18	3	1	52	1040	Mixed
35	9	21	17	5	1	53	1060	Nitrogen.
36	10	23	20	5	1¼	59¼	1185	Group.
37	8	16	20	4	1¼	49¼	985	Mixed Minerals.
38	12	18	14	4	1	49	980	Tankage.
39	14	20	15	4	1	54	1080	Group.
40	14	21	29	5	1	70	1400	
41	14	20	16	4	1¼	55¼	1105	Tankage.
42	6	12	13	4	0	35	700	Nothing.

An inspection of above will show that while the nitrogenous manures alone have slightly increased the yield whenever it was combined, this increase has been very decided. It also shows that the results obtained with cotton seed meal both alone and in combination were greater than with other forms of nitrogen, and that large quantities of nitrogen have not paid for increased cost.

PHOSPHORIC ACID MANURES—*Size of Experiment* 1-30 *acre.*
PLAT NO. 6—COTTON.

No. 1—Nothing.
No. 2—9 lbs. Dissolved Bone Black, 16 per cent soluble.
No. 3—10 lbs Acid Phosphate.
No. 4—10 lbs Orchilla Phosphate.
No. 5—10 lbs Bone Dust.
No. 6—10 lbs Charleston Floats.
No. 7 { 10 lbs Cotton Seed Meal. / 3 lbs Muriate Potash. } Basal Mixture.
No. 8 { 4½ lbs Dissolved Bone Black=⅛ ration. / Basal Mixture.
No. 9 { 9 lbs Dissolved Bone Black=¼ ration. / Basal Mixture.
No. 10 { 13½ lbs Dissolved Bone Black=1 ration. / Basal Mixture.
No. 11—*Nothing.*
No. 12—*Basal Mixture.*
No. 13 { 5 lbs Acid Phosphate=⅛ ration. / Basal Mixture.
No. 14 { 10 lbs Acid Phosphate=¼ ration. / Basal Mixture.
No. 15 { 15 lbs Acid Phosphate=1 ration. / Basal Mixture.
No. 16—Basal Mixture.
No. 17 { 4½ lbs Precipitated Dissolved Bone Black=⅛ ration. / Basal Mixture.
No. 18 { 9 lbs Precipitated Dissolved Bone Black=¼ ration. / Basal Mixture.
No. 19 { 13½ lbs Precipitated Dissolved Bone Black=1 ration. / Basal Mixture.
No. 20—Nothing.
No. 21—Basal Mixture.
No. 22 { 5 lbs Orchilla Phosphate=⅛ ration. / Basal Mixture.
No. 23 { 10 lbs Orchilla Phosphate=¼ ration. / Basal Mixture.
No. 24 { 15 lbs Orchilla Phosphate=1 ration. / Basal Mixture.
No. 25—Basal Mixture.
No. 26 { 5 lbs Bone Dust=⅛ ration. / Basal Mixture.
No. 27 { 10 lbs Bone Dust=¼ ration. / Basal Mixture.
No. 28 { 15 lbs Bone Dust=1 ration. / Basal Mixture.
No. 29—Nothing.
No. 30—Basal Mixture.
No. 31 { 5 lbs Charleston Floats=⅛ ration. / Basal Mixture.
No. 32 { 10 lbs Charleston Floats=¼ ration. / Basal Mixture.
No. 33 { 15 lbs Charleston Floats=1 ration. / Basal Mixture.
No. 34—Basal Mixture.
No. 35 { 3 lbs Gypsum=⅛ ration. / Basal Mixture.
No. 36 { 6 lbs Gypsum=¼ ration. / Basal Mixture.
No. 37 { 9 lbs Gypsum=¼ ration. / Basal Mixture.
No. 38—Basal Mixture.
No. 39—Nothing.
Treatment of No. 6 same as No. 5.

YIELD OF PLAT NO 6.

No. of Experiment.	First Picking.	Second Picking.	Third Picking.	Fourth Picking.	Fifth Picking.	Total.	Total Per Acre.
1	9	13	19	6	¼	47¼	1432
2	5	13	22	9	1	50	1500
3	5	15	18	8	⅜	46⅜	1402
4	6	12	11	5	½	34½	1035
5	8	14	9	2	½	33½	1005
6	8	15	8	4	¼	35¼	1072
7	7	13	15	5	½	40½	1215
8	8	13	17	4		42	1260
9	8	13	14	6	⅛	41⅛	1245
10	9	13	12	3	¼	37¼	1132
11	5	10	8	2	1	26	780
12	6	11	11	3		31	930
13	8	12	18	4		42	1260
14	9	13	16	4		41	1230
15	10	12	14	4		40	1200
16	6	8	6	5		25	750
17							
18							
19							
20							
21				*			
22							
23							
24							
25							
26	4	8	12	10		34	1020
27	5	9	10	8		32	960
28	6	10	11	6		33	990
29							
30	4	1	6	5		23	690
31	4	12	12	5		33	990
32	5	10	11	4		30	900
33	5	14	11	6		36	1080
34	4	12	13	4		33	990
35	5	11	12	4		32	960
36	5	11	10	5		31	930
37	5	10	10	5		30	900
38	5	11	10	7		33	990
39	4	8	10	4		26	780

*These experiments were partially destroyed by rains in June, and hence not recorded.

A part of the above plat was seriously damaged by the heavy and continuous rains of June, and results for complete comparison are vitiated. However the soluble forms of phosphoric acid have given increased yields over the insoluble forms in bone dust and floats.

POTASSIC MANURES.

Each Experiment One-Thirtieth of Acre.

PLAT NO. 7—COTTON.

No. 1—Nothing.
No. 2—12 lbs Kainite.
No. 3—3 lbs Muriate Potash.
No. 4—6 lbs Sulphate Potash.
No. 5 { 10 lbs Cotton Seed Meal. / 10 lbs Acid Phosphate, } =Meal Phosphate.
No. 6 { 12 lbs Kainite=$\frac{1}{3}$ ration. / Meal Phosphate.
No. 7 { 24 lbs Kainite=$\frac{2}{3}$ ration. / Meal Phosphate.
No. 8 { 36 lbs Kainite=1 ration. / Meal Phosphate.
No. 9—Meal Phosphate.
No. 10—Nothing.
No. 11 { 3 lbs Muriate Potash=$\frac{1}{3}$ ration. / Meal Phosphate.
No. 12 { 6 lbs Muriate Potash=$\frac{2}{3}$ ration. / Meal Phosphate.
No. 13 { 9 lbs Muriate Potash=$\frac{3}{3}$ ration. / Meal Phosphate.
No. 14—Meal Phosphate.
No. 15 { 6 lbs Sulphate Potash=$\frac{1}{3}$ ration. / Meal Phosphate.
No. 16 { 12 lbs Sulphate Potash=$\frac{1}{3}$ ration. / Meal Phosphate.
No. 17 { 18 lbs Sulphate Potash=1 ration. / Meal Phosphate.
No. 18—Meal Phosphate.
No. 19—Nothing.

Treatment of No. 7 same as No 5

YIELD OF PLAT NO. 7.

No. of Experment.	First Picking.	Second Picking.	Third Picking.	Fourth Picking.	Fifth Picking.	Total Yield.	Yield per acre.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs	lbs.
1	3	8	3	4	.....	18	540
2	4	8	4	2	.....	18	540
3	5	9	3	3	.....	20	600
4	4	8	4	3	.....	19	570
5	8	16	9	4	.....	37	1110
6	6	18	11	5	.....	40	1200
7	6	16	13	2	.....	37	1110
8	5	17	14	3	1	40	1200
9	7	21	9	5	1½	42½	1275
10	4	10	4	5	2	25	750
11	4	13	24	8	½	49½	1485
12	5	12	25	8	¼	50¼	1507
13	6	12	26	6	.....	50	1500
14	8	14	25	2	.....	49	1470
15	9	13	25	3	.....	51	1530
16	8	14	26	2	.....	50	1500
17	7	13	25	2	.....	47	1410
18	8	12	24	3	.....	47	1410
19	4	9	8	2	.....	23	690

No form of Potash has given decided gains.

PLAT NO. 8—COTTON.

No. 1—25 lbs Studniczka's Guano.
No. 2—50 lbs Studniczka's Guano.
No. 3—25 lbs Planters Fertilizer.
No. 4—50 lbs Planters Fertilizer.
No. 5—24 lbs Raw cotton seed.
No. 6—36 lbs Raw cotton seed.
No. 7—48 lbs Raw cotton Seed, and 5 lbs Acid Phosphate.
No. 8—72 lbs Raw cotton seed.
No. 9—48 lbs Raw cotton seed. 5 lbs Acid Phosphate, and 5 lbs kainite.
No. 10—Nothing.
No. 11—36 lbs Compost.*
No. 12—36 lbs Compost.* and 5 lbs. Kainite.
No. 13—72 lbs Compost *
No. 14—72 lbs Compost.* and 5 lbs. Kainite.
No. 15—96 lbs Compost.*
No. 16—120 lbs Compost.*

*Compost prepared as directed in Bulletin No. 2, and this Bulletin page 8.

Treatment of Plat 8 same as No. 5.

POPULAR MANURES.

Each Experiments 1-30 *Acres.*

YIELD OF PLAT NO. 8.

No. of Experiment.	First Picking.	Second Picking.	Third Picking.	Fourth Picking.	Fifth Picking.	Total.	Yield Per Acre.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	8	10	4	1		23	690
2	10	16	5	1		32	960
3	7	15	5	1		28	840
4	9	18	9	4		40	1200
5	8	12	4	2	1	27	810
6	8	15	5	1		29	870
7	9	15	8	2		34	1020
8	8	14	6	2	1¼	30¼	937
9	8	15	9	2	1	35	1050
10	4	8	6	2		20	600
11	10	16	9	2		37	1110
12	9	17	8	3		37	1110
13	10	18	10	2		40	1200
14	10	17	12	3		42	1260
15	12	18	11	3		44	1320
16	13	20	12	4		49	1470

In the above, Acid Phosphate has increased the yield of Raw cotton seed, while Kainite has given no decided gains.

Besides the above the following experiments were made in different modes of cultivation. The manures used were the same, and they varied only in the methods of cultivation.

CULTIVATION EXPERIMENTS.

PLAT NO. 9—COTTON.

No. 1—May 20th, plowed with bull tongue; June 24th, plowed with bull tongue; July 10th, laid by with scooter and scraper.

No 2—May 26th, plowed with bull tongue; June 24th, plowed with scooter and scraper; July 10th, laid by with scooter and scraper.

No. 3—May 20th, plowed with scooter and scraper; June 24th, plowed with scooter and scraper; July 10th, laid by with scooter and scraper.

No. 4—May 20th, plowed with scooter and scraper; June 24th, plowed with bull tongue; July 10th, laid by with scooter and scraper.

No. 5—May 20th, plowed with turn shovel; June 24th, plowed with turn shovel; July 10th, laid by with scooter and scraper.

No. 6—May 20th, plowed with turn shovel; June 24th, plowed with bull tongue; July 10th, laid by with scooter and scraper.

No. 7—May 20th, plowed with turn plow; June 24th, plowed with turn plow; July 10th, laid by with scooter and scraper.

No. 8—May 20th, plowed with turn plow; June 24th, plowed with bull tongue: July 10th, laid by with scooter and scraper.

YIELD OF PLAT NO. 6.

No. 1	39 lbs	1170 lbs per acre.
" 2	42 "	1260 " " "
" 3	41 "	1230 " " "
" 4	46 "	1380 " " "
" 5	45 "	1350 " " "
" 6	42 "	1260 " "
" 7	36 "	1080 " "
" 8	43 "	1290 " "

The following Varieties of Cotton were planted:

PLAT NO. 10—COTTON.

No. 1—Jower's Improved.
No. 2—Cherry's Long Staple.
No. 3—S. B. Maxey's Cotton.
No. 4—Shine's Early Prolific.
No. 5—Griffin's Improved.
No. 6—Taylor's Improved.
No. 7—Bancroft's Extra Prolific Herlong.
No. 8—Peterkin's Improved.
No. 9—Jones' Improved.

CULTIVATION LIKE PLAT NO. 5.

Small quantities of above seed were used, and it is very difficult to decide upon the relative merits of the varieties of cotton on small areas. They will be tested on a larger scale next year.

CONCLUSION.

The results of the experiments above given but confirm the hitherto entertained opinion that cotton seed meal was our cheapest best form of nitrogen for cotton, and combined with soluble phosphate and kainite, give a manure fully the equal of any to be obtained. On lands badly worn and deficient in vegetable matter, the cotton seed meal may be advantageously increased even to an equal quantity with acid phosphate. On lands having already a tendency to excessive weed, it may be decreased. therwisie the formula given in Bulletin No. 2 and repeated in this Bulletin page 6, will be found best adapted to the requirements of cotton.

STATE BUREAU OF AGRICULTURE,
OFFICE OF COMMISSIONER,
Baton Rouge, La., March 22d, 1887.

The following partial list of Commercial Fertilizers. sold in this State, is published in this Bulletin, in order to give the public the benefit of the quarantees. Later a complete list with guranteed analyses, selling prices and commercial values per ton will be published.

T. J. BIRD,
Commissioner of Agriculture.

GUARANTEED ANALYSES OF COMMERCIAL FERTILIZERS, AS RENDERED TO COMMISSIONER OF AGRICULTURE BY DEALERS AND MANUFACTURERS TO WHOM LICENSES HAVE BEEN ISSUED FOR SEASON 1886-87.

NAME OF FERTILIZER OR CHEMICAL.	BY WHOM REPORTED. Name.	Address.	By whom Manufactured.	Where Manufactured.	Weight of Package.	Nitrogen.	PHOSPHORIC ACID. Soluble.	Reverted.	Insoluble	Potash.	Cash Price per ton to Farmers.
Sterns Ammoniated	Stern's Fert. & Chem. Mf'g Co	14 Union St., New Orleans	Stern's Fert. & Chem. Mf'g Co.	New Orleans	200	2 to 3	6 to 8	3 to 4	.....	2 to 3	$ 30.00
Sterns Pure Ground R w Bone	" " " " "	" "	" " " " "	" "	200	4½ to 4¾	.....	.....	20 to 25	.....	35.00
Acid Phosphate	" " " " "	" "	" " " " "	" "	200	.....	14 to 18	1 to 3	.....	.....	16 to 25
Kainite	" " " " "	" "	Imported	Imported	200	.....	.....	.....	.....	13 to 14	12 to 14
Acid Phosphate	Wm. Garig & Co.	Baton Rouge	Imported	Engl nd	150	.....	15	5	.2	.....	.....
Soluble Pacific Guano	W. P. Richardson	33 Carondelet St., N. O.	Pacific Guano Co., Boston	Charleston, S. C., and Woods Hall, Mass.,	200	215 to 255	7 to 8.75	3 to 3.75	2 to 2.50	1 to 1.50	cot. grade
Soluble Pacific Guano	Rep. Glidden & Curtis, Boston				200	240 to 3	6½ to 8	2½ to 4	2 to 3	3½ to 4¼	sug. grade
Studniczkas Standard Sugar Cane Fert	Henry Studniczka	41 North Peters St., N. O	Wahl Bros.	Chicago, Ill.	100	2½ to 3	9 to 11		1 to 2	.....	30.00
Studniczkas Standard Sugar Cane Fert	Henry Studniczka	" "	" "	" "	100	2½ to 3	9 to 11		1 to 2	2½	.....
Gossoypium Phospho	Geo. W. Scott M'fg Co.	Atlanta, Georgia	Geo. W. Scott M'fg Co.	Atlanta, Georgia	200	240 to 2½	6 to 6½	3.80 to 4	1½ to 2⅝	1½ to 2¼	.....
Scott's Best Acid Phosphate	" " "	" "	" "	" "	200	.....	7½ to 8½	4½ to 5⅜	1½ to 2½	2 to 2¼	.....
Scott's High Grade Acid Phosphate	" " "	" "	" "	" "	200	.....	8 to 9	5 to 6	2 to 2¾	.....	.....
Standard Home Mixture Guano	Meridian Fertiliz ng Factory	Meridian, Mississippi	Meridian Fertilizing Factory	Meridian, Mississippi	200	2¼ to 2½	7½ to 9	9 to 11	1 to 2	2¼ to 3	.....
Bone and Potash	" " "	" "	" "	" "	200	.....	8 to 10	10 to 13	1 to 2	2¼ to 3	.....
Challmette Mills Fertilizer	W. A. Ober, Agent	197 Gravier St., N. O.	G. Ober & Sons Co.	Cor Adams & S Peter St. N. O.	125	2 to 3½	4 to 5	3½ to 4½	1¼ to 1¾	2 to 3	.....
Sugar Fertilizer	Planters Fertilizers M'fg Co.	111 Magazine St., N. O.	Planters Fertilizing M'fg Co.	New Orleans	100	2 5 to 4	7 5 to 9	.....	.....	2 to 3	22.50
Cotton Fertilizer	" " "	" "	" "	" "	100	3	10	.....	.....	2	22.50
Atlantic Fertilizer	Pelzer Rodyers & Co.	Charleston, S. C.	Atlantic Phosphate Co.	Charleston, S. C.	200	2.05	6.50	1.50	1.50	2	.....
Armour Bone Meal	H. Studniczka	41 North Peters St. N. O.	Armour & Co.	Chicago, Ill.	100	4 to 5	.....	.....	25 to 28	.....	28.00
Standard Cotton and Sugar Guano	Haynes & Rodyers	101 Poydras St., N. O.	Farmers Fertilizing Co.	Syracuse, New York	200	1 to 2	8 to 9	.....	3 to 4	4 to 6	.....
Armour Hog Tankage	H. Studniczka S. Sole Agent	41 North Peters St., N. O.	Armour & Co.	hicago	100	8 to 9	.....	.....	12 to 15	.....	26.00
Acid Phosphate	Planters Fertilizing Co.	111 Magazine St., N. O.	Imported	England	150	.....	15.16	5	.2	.....	.....
Kainite	" " "	" "	"	Germany	.....	.....	.....	.....	.....	12 to 14	.....